



ELECTROKINETIC POTENTIAL OF SOME HYDROXYBENZOIC ACIDS AND HYDROXYBENZOIC ACIDS - β -GLUCAN MODELS



Ivana Tomac, Jozo Ištuk, Petra Matić, Ana Ivanković, Josipa Jelić, Lidija Jakobek

Josip Juraj Strossmayer University of Osijek, Faculty of Food Technology Osijek, Franje Kuhača 18, 31000 Osijek, Croatia

Hydroxybenzoic acids are subgroup of phenolic acids. 4-hydroxybenzoic acid, gallic acid, vanillic acid, salicylic acid are some of hydroxybenzoic acids. Structure of hydroxybenzoic acids differ because of the hydroxylation and methylations of aromatic ring. β -glucan is soluble dietary fiber constructed of glucose units. Electrokinetic potential is also known as zeta potential. Zeta potential is a physical property expressed on the surface of a macromolecule, respectively as potential at the shear plane distance. Knowledge of the zeta potential could predict the long-term stable behavior of a macromolecule. The aim of this work was to predict a long-term stability of macromolecules such as 4-hydroxybenzoic acid - β -glucan model and gallic acid - β -glucan model in different pH (1.5, 5.5, 7.5, 10) and during the time period (0, 1, 2, 5, 16h).

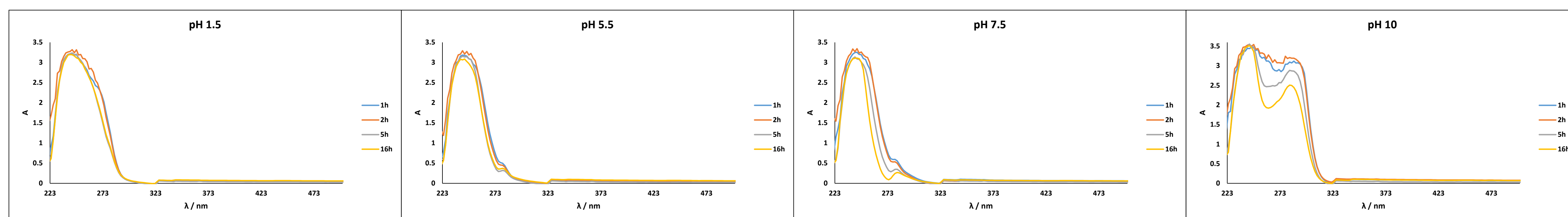


Figure 1. UV/Vis spectra of 4-hydroxybenzoic acid (25 mg/L)- β -glucan (5 mg/L) model through various pH values during the time period of 0, 1, 2, 5 and 16 h

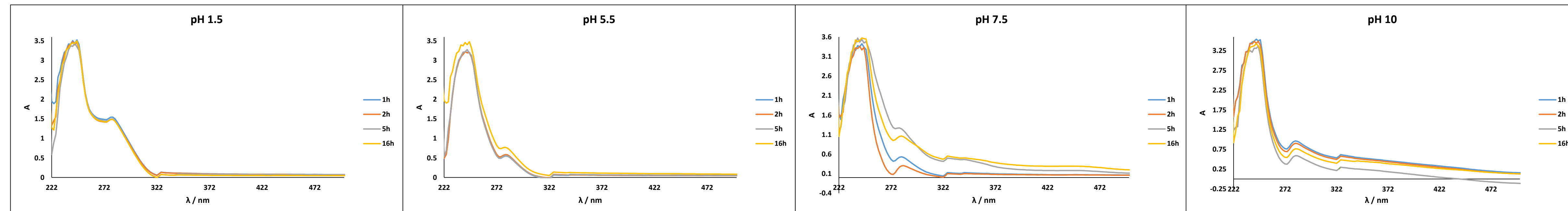


Figure 2. UV/Vis spectra of gallic acid (25 mg/L)- β -glucan (5 mg/L) model through various pH values during the time period of 0, 1, 2, 5 and 16 h

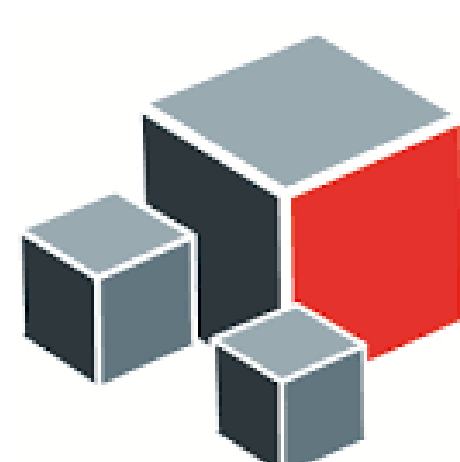
Table 1 Zeta potential values of different concentrations of 4-hydroxybenzoic acid and gallic acid and β -glucan through various pH values

γ (mg/L)	Compound	pH 1.5	pH 5.5	pH 7.5	pH 10
5	β -glucan	5.8 \pm 1.0	-7.6 \pm 3.6	-8.0 \pm 0.5	-14.3 \pm 1
25	4-HBA	8.1 \pm 3.3	-6.7 \pm 1.6	0.5 \pm 5.1	-29.2 \pm 2.4
	GA	9 \pm 2.9	-11.2 \pm 7.1	-17 \pm 2.1	-24.5 \pm 8.8
50	4-HBA	5.2 \pm 3	-3.1 \pm 1.6	5.4 \pm 2.2	-21.8 \pm 1.8
	GA	6.9 \pm 0.4	-9.4 \pm 0.1	17.7 \pm 2.4	-26 \pm 1.7
75	4-HBA	6.2 \pm 2.1	-6.3 \pm 6.4	-7.2 \pm 10.7	-28.3 \pm 5.4
	GA	7.8 \pm 1.5	-9.6 \pm 1.4	-16.1 \pm 3.2	-29.5 \pm 1.8
100	4-HBA	0.2 \pm 1.5	-5.2 \pm 3.8	-11.8 \pm 14.9	-21.8 \pm 8.7
	GA	7.6 \pm 3.3	-14.5 \pm 4.8	-14.6 \pm 1.8	-30 \pm 1.2
150	4-HBA	2.1 \pm 0.7	-4.8 \pm 0.5	-7.6 \pm 7.1	-20.9 \pm 2.5
	GA	6.6 \pm 1.3	-8.7 \pm 2.6	11 \pm 1.5	-27.8 \pm 0.3

Table 2 Zeta potential values of 4-hydroxybenzoic acid - β -glucan model and gallic acid - β -glucan model through various pH values during the time period

γ (mg/L)	Model	pH 1.5	pH 5.5	pH 7.5	pH 10
0	4-HBA- β -glucan	6 \pm 2.3	-2.6 \pm 2.9	1.7 \pm 1.7	-6.4 \pm 3
	GA- β -glucan	4.8 \pm 1.4	-2.3 \pm 0.5	-8.1 \pm 1.5	-18.1 \pm 3
1	4-HBA- β -glucan	6 \pm 1.8	-4.7 \pm 2.4	-15 \pm 2.3	-13.1 \pm 1.9
	GA- β -glucan	5.7 \pm 1.8	-3.5 \pm 1.7	-6.5 \pm 4.1	-12 \pm 2.4
2	4-HBA- β -glucan	5.6 \pm 1.5	-3.6 \pm 0.8	-17 \pm 4.3	-14.6 \pm 2.9
	GA- β -glucan	4.6 \pm 2	-4.2 \pm 0.2	-10 \pm 5	-21 \pm 8.4
5	4-HBA- β -glucan	4.8 \pm 0.3	-3.9 \pm 1.9	-11.6 \pm 3.8	-21.2 \pm 1.3
	GA- β -glucan	6.4 \pm 1.4	-4.6 \pm 1.8	-8.8 \pm 1.7	-17.8 \pm 3.1
16	4-HBA- β -glucan	4.3 \pm 2.4	-1.8 \pm 0.4	-13.9 \pm 5.4	-17.2 \pm 4.3
	GA- β -glucan	5.7 \pm 0.8	-2.8 \pm 0.3	-10.1 \pm 4.5	-11.5 \pm 5.1

The zeta potential values have shown that analyzed models have been stable in pH 10 according the theoretical stability criteria. In addition, absorption spectra of selected hydroxybenzoic acids and theirs models were recorded.



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